Claim 139: The isolated nucleic acid molecule of claim 110, comprising SEQ ID NO: 8.

Claim 140: The isolated nucleic acid molecule of claim 110, consisting of SEQ ID NO: 7.

Claim 141: The isolated nucleic acid molecule of claim 110, consisting of SEQ ID NO: 6.

Claim 142: The isolated nucleic acid molecule of claim 110, consisting of SEQ ID NO: 7.

Claim 143: The isolated nucleic acid molecule of claim 110, consisting of SEQ ID NO: 8.

REMARKS

The preceding amendment is presented in accordance with 37 CFR § 1.121(h). Claims 110-143 will be pending.

The amendment address points 3 and 10 of the office action. The objections to claims 108 and 109 are obviated via the sequence listing. Applicants note that the sequence listing objection was not sent with the June 5 office action, but was telefaxed on June 12, 2001.

Prior to addressing the bases for rejecting the claims, it is worthwhile to discuss what the empirical evidence provided in the application shows.

In example 1, a melanoma cell line is discussed. The prior art describes how various members of the CT family of antigens are expressed by this cell. The cell was used to determine expression of other members of the family. It should be borne in mind that the term "CT antigen" is discussed in the specification.

The cells were studied, using the "SEREX" methodology. This method is known in the art. To perform SEREX, total RNA is removed from cells, converted to cDNA and, a cDNA library is constructed in a vector. In this case, "λZAP" was used. The λZAP cDNA library was then used to transform E. coli.

After E. coli are transformed, the transformed cells are used to screen samples for antibodies. Allogeneic samples were used in example 1. Essentially, one is determining if the

protein encoded by the cDNA used to transform the E. coli reacts with antibodies in the sample. One knows that the reaction is not with a "native" E. coli protein, because in the SEREX method, such antibodies are "stripped" prior to reaction with the transformants. Applicants refer the examiner to the references cited at page 5, i.e., Sahin, et al, *Proc. Natl. Acad Sci USA* 92:11810-11813, and U.S. Patent No. 5,698,396, both of which are incorporated by reference. Full details of the SEREX methodology are described in these references. Hence, one knows that, if there are any positives, the reactive protein was from the cDNA library.

The yield in this experiment was high, i.e., there were 65 positives.

Example 2 describes, simply, attempts to identify the positive materials. Standard methods were used.

Table 8, at page 8, shows that of the 65 positives 18 were known CT antigens. Hence, one knows from this that one can identify known members of the CT family. Ten sequences were not identifiable in public sequence libraries. There were also, 33 clones which belonged to the "KOC" family.

Examples 3 and 5 deal with CT antigen, i.e., "CT7." Please see US Patent No. 6,297,364.

Example 6 describes sequence analysis of the 33 members of the family found in the experiments of example 2. As this example makes manifestly clear, two different genes, referred to as KOC-2 and KOC-3 were identified. They were clearly not artifacts, because when a testicular cDNA library was analyzed, again using allogeneic samples, the molecules were found.

In example 7, the DNA expression pattern of the genes was studies. KOC-2 was found in normal tissue, but only testis and, with modification of the assay, in normal kidney cells. This is a "classic" CT expression pattern. As noted in the application, "CT" means "cancer/testis."

The KOC-3 gene was found to be expressed in both cancer and normal cells.

Now, the examiner has rejected all of claims 53-73, 80-84, 108 and 109, arguing that the claims are not supported by either "a specific substantial utility or a well-established utility."

The examiner states that "the specification fails to demonstrate a utility for the nucleic acids of SEQ ID NOS: 5-8, as the specification fails to correlated the presence of the protein encoded by SEQ ID NOS: 5-8 in clinical samples." The examiner then goes on to hypothesize that (i) antibodies can cross react with different proteins, and (ii) that the polynucleotides may

not be expressed due to any of a number of hypotheses. The examiner also states that "under conditions of recombinant expression, epitopes of KOC-2 and 3 which are not normally expressed in a patient within the context of MHC could be expressed by E. coli."

All of this is unproven speculation. The facts are the following. Something in the serum of patient NW38 reacted with a protein expressed by cDNA from an allogeneic source. Antibodies were present in the cancer patient's serum. They did not react with an E. coli protein because, as has been pointed out, supra, when SEREX is carried out, any reactivity with E. coli proteins is eliminated by use of controls. Again, the examiner is directed to the references which describe the SEREX methodology.

With respect to the elaborate argument regarding factors affecting translation of proteins, this is all well and good, but it is irrelevant. It is irrelevant because there were antibodies in the sample analyzed. Antibodies are produced in response to a protein. Hence, at some point, NW38 (the source of the sample), did have the protein in his or her blood. It got there by being expressed. The issue for CT antigens, as was set forth very clearly in the specification, is: are they expressed in individuals with cancer? The evidence indicates that KOC-2 and KOC-3 are so expressed, regardless of what happened to the irrelevant ferritin polypeptide, ornithine decarboxylase, and p glycoprotein discussed by the examiner, and not shown to be cancer antigens. With respect to the failure of protein and mRNA levels to correlate for p53, again, this is irrelevant. Applicants have not claimed a quantitative assay. The correct question is: is the molecule expressed in cancer patients and usable for diagnosis? The correlation of p53 with cancer is too well known to comment on.

With respect to the examiner's hypothetical argument that "antibodies bind to epitopes in proteins and antibodies can cross react with different proteins containing the same or similar proteins," this again ignores the evidence. In the SEREX methodology, antibodies against a host cell, e.g., E. coli, are removed in a stripping step. All that is left are antibodies which bind to non-E. coli proteins. Applicants used a cDNA library. It is well known that, when using a cDNA library, a single cDNA molecule is used as the transfectant. Hence, if an antibody reacts with a transfected or transformed cell, it must be reacting with the foreign protein, since antibodies to native proteins have been eliminated. Hence, all of the examiner's points are based upon generalizations which do not stand up to analysis when the data re considered. With respect to the statement bridging pages 4-5:

> "The data indicating that the KOC-2 polynucleotide was restricted to the normal testis and that the KOC-3 polynucleotide was universal in normal tissues."

This is absolutely an incorrect reading of the data. First of all, there were antibodies against KOC-2 and KOC-3 found in the patient (NW38) sample. Hence, there was no immunotolerance. Second, the data state that "the only positive normal tissue was testis." These do not state that this was the only positive tissue. There is a very big difference. Further, if the examiner is going to argue that levels of expression can vary, then she must concede that, notwithstanding expression of KOC-3 in normal tissue, cancer tissues express it at a level such that an immune response is possible - especially since applicants have shown this.

Turning next to the rejection under 35 USC § 112, the statement of this rejection is not consistent. All claims are rejected, even though the examiner states that the claims are enabling for "polynucleotides comprising SEQ ID NOS: 5-8..." If this is the case, then claims 54-70 and 108 and 109 should not be rejected, as claims 54-70 expressly recite what is said to be enabled, and claims 108 and 109 have nothing to do with the issues raised in the rejection. The rejection recites points "A" and "B," and it is noted that only claims 53, 71-73 and 80-84 are rejected. They are no reasons given for rejecting the remaining claims.

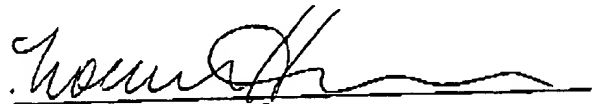
Applicants contacted the examiner regarding this issue on October 22. The undersigned was advised that, if the utility rejection were overcome, then the issue at point 7 would be moot. It is noted that claims 54-70 are not rejected in the discussion following point 7. Claims 53 & 54 were combined to form claim 110. As such, claim 110 and claims dependent thereon cannot be rejected under 35 USC §112.

In view of the foregoing, allowance of this application is believed proper and is urged.

In view of the lack of clarity in this rejection, applicants cannot address it. The examiner is invited to clarify the rejection so it can be addressed. At such time, applicants will respond fully.

Respectfully submitted,

FULBRIGHT & JAWORSKI, L.L.P.



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